



AMENDMENTS TO THE CLAIMS

1. (currently amended) A voltage boosting circuit comprising:

a first circuit, said first circuit having a first input connected to a reference voltage and a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit outputting a boosted output voltage on an output node based on the pre-charge voltage and the first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit using a voltage on the second node and the reference voltage to generate the first output,

wherein said second circuit comprises a tracking capacitor connected between the output and second nodes, said tracking capacitor producing the voltage at the second node.

2. (original) The voltage boosting circuit of claim 1, wherein the voltage on said second node is indicative of the boosted output voltage.

3. (original) The voltage boosting circuit of claim 1, wherein the voltage on said second node is indicative of a difference between the boosted output voltage and the pre-charge voltage.

4. (original) The voltage boosting circuit of claim 1, wherein the first output is a current based on a difference between the boosted output voltage and the reference voltage.

5. (canceled)

6. (canceled)

7. (currently amended) ~~The voltage boosting circuit of claim 6, further comprising:~~ A voltage boosting circuit comprising:

a first circuit, said first circuit having a first input connected to a reference voltage and a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit outputting a boosted output voltage on an output node based on the pre-charge voltage and the first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit using a voltage on the second node and the reference voltage to generate the first output, said second circuit comprising a first capacitor connected between said pre-charge voltage and a third node connected to the first output and a second capacitor connected between the output node and the second node;

a first switch connected between the third node and a ground potential; and

a second switch connected between the second node and the ground potential,

wherein in a pre-charge phase, said switches are closed to allow the capacitors to be pre-charged to the pre-charge voltage.

8. (original) The voltage boosting circuit of claim 7, wherein in a boosting phase, said switches are open, preventing the capacitors from being pre-charged to the pre-charge voltage, said first capacitor being boosted by the first output to cause the boosted output voltage to be present at said output node.

9. (currently amended) ~~The voltage boosting circuit of claim 1,~~ A voltage boosting circuit comprising:

a first circuit, said first circuit having a first input connected to receive a reference voltage, said first circuit having a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit adapted to output a boosted output voltage on an output node based on a received pre-charge voltage and first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit being adapted to use a voltage on the second node and the reference voltage to generate the first output,

wherein said first circuit comprises a voltage-to-current converter circuit and said first output is a current based on a difference between the voltage on the second node and the reference voltage.

10. (currently amended) ~~The voltage boosting circuit of claim 1,~~ A voltage boosting circuit comprising:

a first circuit, said first circuit having a first input connected to receive a reference voltage, said first circuit having a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit adapted to output a boosted output voltage on an output node based on a received pre-charge voltage and first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit being adapted to use a voltage on the second node and the reference voltage to generate the first output,

wherein said first circuit comprises:

a current source adapted to output ~~outputting~~ a control current; and

a differential circuit having a first input connected to receive the reference voltage and a second input connected to receive the voltage at the second node, said differential circuit having a common-source output for said first output, said first output being controlled by the control current and having a value based on a difference between the voltage on the second node and the reference voltage.

11. (original) The voltage boosting circuit of claim 10, wherein said differential circuit comprises a differential transistor input pair.

12. (original) The voltage boosting circuit of claim 10, wherein said differential circuit comprises cascaded transistors.

13. (original) The voltage boosting circuit of claim 10, wherein said current source controls a rising time of the boosted output voltage.

14. (currently amended) ~~The voltage boosting circuit of claim 1,~~ A voltage boosting circuit comprising:

a first circuit, said first circuit having a first input connected to receive a reference voltage, said first circuit having a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit adapted to output a boosted output voltage on an output node based on a received pre-charge voltage and first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit

being adapted to use a voltage on the second node and the reference voltage to generate the first output,

wherein said first circuit comprises:

a current source outputting a control current; and

an integrator circuit having a first input connected to the reference voltage and a second input connected to the voltage at the second node, said first output being controlled by the control current and having a value based on a difference between the voltage on the second node and the reference voltage.

15. (original) The voltage boosting circuit of claim 14, wherein said current source controls a rising time of the boosted output voltage.

Claims 16-21 (canceled)

22. (currently amended) A pixel cell for an imager, said pixel cell comprising:

a first circuit element connected to a voltage; and

a voltage boosting circuit outputting said voltage to said first circuit element, said boosting circuit comprising:

a first circuit, said first circuit having a first input connected to a reference voltage and a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit outputting a boosted output voltage on an output node based on the pre-charge voltage and the first output, said second circuit having a

second node connected to a second input of the first circuit, said first circuit using a voltage on the second node and the reference voltage to generate the first output,

wherein said first circuit comprises a voltage-to-current converter circuit and said first output is a current based on a difference between the voltage on the second node and the reference voltage.

23. (original) The pixel cell of claim 22, wherein the voltage on said second node is indicative of the boosted output voltage.

24. (original) The pixel cell of claim 22, wherein the voltage on said second node is indicative of a difference between the boosted output voltage and the pre-charge voltage.

25. (original) The pixel cell of claim 22, wherein the first output is a current based on a difference between the boosted output voltage and the reference voltage.

26. (currently amended) ~~The pixel cell of claim 22,~~ A pixel cell for an imager, said pixel cell comprising:

a first circuit element connected to a voltage line; and

a voltage boosting circuit adapted to output a voltage on the line to said first circuit element, said boosting circuit comprising:

a first circuit, said first circuit having a first input connected to receive a reference voltage, said first circuit having a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit adapted to output a boosted output voltage on an output

node based on the pre-charge voltage and the first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit adapted to use a voltage on the second node and the reference voltage to generate the first output,

wherein said second circuit comprises a tracking capacitor connected between the output and second nodes, said tracking capacitor producing the voltage at the second node.

27. (canceled)

28. (currently amended) ~~The pixel cell of claim 27, wherein said boosting circuit further comprises:~~ A pixel cell for an imager, said pixel cell comprising:

a first circuit element connected to a voltage; and

a voltage boosting circuit outputting said voltage to said first circuit element, said boosting circuit comprising:

a first circuit, said first circuit having a first input connected to a reference voltage and a first output;

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit outputting a boosted output voltage on an output node based on the pre-charge voltage and the first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit using a voltage on the second node and the reference voltage to generate the first output, said second circuit comprising a first capacitor connected between said pre-charge voltage and a third node connected to the first output and a second capacitor connected between the output node and the second node;

a first switch connected between the third node and a ground potential; and

a second switch connected between the second node and the ground potential,

wherein in a pre-charge phase, said switches are closed to allow the capacitors to be pre-charged to the pre-charge voltage.

29. (original) The pixel cell of claim 28, wherein in a boosting phase, said switches are open, preventing the capacitors from being pre-charged to the pre-charge voltage, said first capacitor being boosted by the first output to cause the boosted output voltage to be present at said output node.

30. (canceled)

31. (currently amended) ~~The pixel cell of claim 22,~~ A pixel cell for an imager, said pixel cell comprising:

a first circuit element connected to a voltage; and

a voltage boosting circuit outputting said voltage to said first circuit element, said boosting circuit comprising:

a first circuit, said first circuit having a first input connected to a reference voltage and a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit outputting a boosted output voltage on an output node based on the pre-charge voltage and the first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit using a

voltage on the second node and the reference voltage to generate the first output,

wherein said first circuit comprises:

a current source outputting a control current; and

a differential circuit having a first input connected to the reference voltage and a second input connected to the voltage at the second node, said differential circuit having a common-source output for said first output, said first output being controlled by the control current and having a value based on a difference between the voltage on the second node and the reference voltage.

32. (original) The pixel cell of claim 31, wherein said differential circuit comprises a differential transistor input pair.

33. (original) The pixel cell of claim 31, wherein said differential circuit comprises cascaded transistors.

34. (original) The pixel cell of claim 31, wherein said current source controls a rising time of the boosted output voltage.

35. (currently amended) ~~The pixel cell of claim 22,~~ A pixel cell for an imager, said pixel cell comprising:

a first circuit element connected to a voltage; and

a voltage boosting circuit outputting said voltage to said first circuit element, said boosting circuit comprising:

a first circuit, said first circuit having a first input connected to a reference voltage and a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit outputting a boosted output voltage on an output node based on the pre-charge voltage and the first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit using a voltage on the second node and the reference voltage to generate the first output,
wherein said first circuit comprises:

a current source outputting a control current; and

an integrator circuit having a first input connected to the reference voltage and a second input connected to the voltage at the second node, said first output being controlled by the control current and having a value based on a difference between the voltage on the second node and the reference voltage.

36. (original) The pixel cell of claim 35, wherein said current source controls a rising time of the boosted output voltage.

37. (original) The pixel cell of claim 22, wherein said first circuit element comprises a reset transistor.

38. (original) The pixel cell of claim 22, wherein said first circuit element comprises a row select transistor.

39. (original) The pixel cell of claim 22, wherein said first circuit element comprises a transfer transistor.

40. (original) The pixel of claim 22, wherein the boosted output voltage is a voltage source of the pixel.

Claims 41-46 (canceled)

47. (currently amended) An imager comprising:

a pixel cell, said pixel cell comprising a first circuit element connected to a boosted voltage, and a voltage boosting circuit outputting said boosted voltage to said first transistor, said boosting circuit comprising:

a first circuit, said first circuit having a first input connected to a reference voltage and a first output; and

a second circuit connected to receive the first output and a pre-charge voltage, said second circuit outputting a boosted output voltage on an output node based on the pre-charge voltage and the first output, said second circuit having a second node connected to a second input of the first circuit, said first circuit using a voltage on the second node and the reference voltage to generate the first output,

wherein said second circuit comprises a tracking capacitor connected between the output and second nodes, said tracking capacitor producing the voltage at the second node.

Claims 48-54 (canceled)

55. (original) A method of manufacturing a voltage boosting circuit, said method comprising:

providing a voltage-to-current converter circuit;

connecting a first input of the voltage-to-current converter to a reference voltage;

providing a capacitive boosting circuit;

connecting an input of the capacitive boosting circuit to an output of the voltage-to-current converter circuit;

connecting the input of the capacitive boosting circuit to a pre-charge voltage source; and

connecting an output of the capacitive boosting circuit to a second input of the voltage-to-current converter circuit.

56. (original) The method of claim 55, wherein the capacitive boosting circuit comprises a tracking capacitor.

57. (original) The method of claim 55, wherein said step of providing a capacitive boosting circuit comprises:

providing a first capacitor connected between the pre-charge voltage source and a node connected to the output of the voltage-to-current converter; and

providing a second capacitor connected between an output node and a node connected to the second input of the voltage-to-current converter.

58. (original) The method of claim 55, wherein said step of providing a voltage-to-current converter comprises:

providing a current source outputting a control current; and

providing an integrator circuit having a first input connected to the reference voltage and a second input connected to the output of the capacitive boosting circuit.

59. (original) The method of claim 55, wherein said step of providing a voltage-to-current converter comprises:

providing a current source outputting a control current; and

providing a differential circuit having a first input connected to the reference voltage and a second input connected to the output of the capacitive boosting circuit.